

We Claim:

1. A microactuator, comprising:

a first plate;

a second plate supported in a spaced relation to said first plate and capable of actuation with respect to said first plate, said first plate capable of exerting an electrostatic force on said second plate upon application of a voltage potential between said first and second plates; and

a third plate, pivotally coupled to said second plate and capable of actuation with respect to said first plate, actuation of said second plate at least assisting in actuation of said third plate.

2. A microactuator as recited in claim 1, wherein said third plate includes a mirror.

3. A microactuator as recited in claim 1, wherein said second plate is between two and ten times longer than said third plate.

4. A microactuator as recited in claim 1, wherein said second plate is between five and seven times longer than said third plate.

5. A microactuator, comprising:

a first plate;

a second plate supported in a spaced relation to said first

plate, said second plate being substantially parallel to said first plate in an unbiased position, and said second plate having an end capable of moving toward said first plate in a biased position, said second plate moving from said unbiased position to said biased position upon application of a voltage potential between said first and second plates; and

a third plate capable of moving between an unactuated position and an actuated position, movement of said second plate from said unbiased position to said biased position at least assisting in moving said third plate from said unactuated position to said actuated position.

6. A microactuator, comprising:

a substrate;

a first plate fixed with respect to said substrate;

a second plate anchored to said substrate and supported in a spaced relation to said first plate and capable of actuation with respect to said first plate, said first plate capable of exerting an electrostatic force on said second plate upon application of a voltage potential between said first and second plates;

a spring mechanism;

a third plate, pivotally coupled to said second plate via said spring mechanism and capable of actuation with respect to said substrate, actuation of said second plate at least assisting in

actuation of said third plate.

7. A microactuator, comprising:

a first variable microcapacitor including a first plate and a second plate capable of moving with respect to said first plate;

a second variable microcapacitor, including a third plate and a fourth plate capable of moving with respect to said third plate;

a fifth plate having a first end and a second end, said second plate coupled to said first end of said fifth plate and said fourth plate coupled to said second end of said fifth plate, actuation of said first microcapacitor at least assisting in rotation of said fifth plate in a first direction, and actuation of said second microcapacitor at least assisting in rotation of said fifth plate in a second direction.

8. A microactuator as recited in claim 7, wherein said fifth plate includes a mirror.

9. A microactuator as recited in claim 8, further comprising a first microspring for pivotally coupling said second plate to said first end of said fifth plate.

10. A microactuator as recited in claim 9, further comprising a

second microspring for pivotally coupling said fourth plate to said second end of said fifth plate.

11. A microactuated mirror for an optical switching array, comprising:

a mirror; and

an actuation plate for actuating said mirror between an unbiased position and a biased position upon application of a voltage to said actuation plate, said actuation plate being two to ten times longer than said mirror.

12. A microactuated mirror as recited in claim 11, said actuation plate being five to seven times longer than said mirror.

13. A microactuated mirror as recited in claim 11, wherein said actuation plate is capable of pivoting with respect to said mirror.

14. A microactuated mirror as recited in claim 11, wherein said actuation plate is fixed with respect to said mirror.

15. A microactuator, comprising:

a base layer including a first stationary electrode and a second stationary electrode;

a first plate, including:

a first end pivotally mounted in a spaced relation from said base layer,

a second free end positioned adjacent said first stationary electrode and spaced from said first stationary electrode in an unbiased condition, and

a central portion between said first and second end;

a second plate, including:

a first end pivotally mounted to said first plate at said central portion, and

a second free end positioned adjacent said second stationary electrode and spaced from said second stationary electrode in an unbiased condition;

a first voltage source for applying a first voltage to said first plate to generate a first electrostatic force between said first plate and said first electrode, said first electrostatic force capable of pivoting said first plate with respect to said base layer; and

a second voltage source for applying a second voltage to said second plate to generate a second electrostatic force between said second plate and said second electrode, said second electrostatic force capable of pivoting said second plate with respect to said first plate.

16. A microactuator as recited in claim 15, wherein said first and

second voltages are equal to each other.

17. A microactuator as recited in claim 15, wherein said first and second voltages are not equal to each other.

18. A microactuator as recited in claim 15, wherein said first voltage is applied at a same time as said second voltage.

19. A microactuator as recited in claim 15, wherein said first voltage is applied prior to said second voltage.

20. A microactuator as recited in claim 15, wherein pivoting of said first plate brings said second plate nearer to said second electrode to increase said second electrostatic force between said second plate and said second electrode.